ProB V1.0.6

Installation Manual

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http://www.ecs.soton.ac.uk/~mal/systems/prob.html

University of Southampton, UK
Declarative Systems and Software Engineering

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1 Installing ProB

Thank you for your interest in ProB.

Please ensure that you are using the correct edition of the installation instructions appropriate to your needs and expertise:

Installation instructions are available in a range of levels of detail. This is not a mistake: some people only require one page, others quite a few more. If you cannot follow the instructions or have problems installing we suggest you look to the installation documentation with the next highest level of detail. (See edition list below.)

If you are having problems installing third party software for use with ProB, in the first instance please see the FAQs that accompany the 'Complete OS' and 'Verbose' editions of the installation instructions below. If your problem is not addressed in these editions, please see the *Trouble Shooting* chapter in the *User Manual*. You may also like to consult the instructions that came with the software causing difficulty. Requests for help may also be sent to the ProB mail list.

If you are unfamiliar with installing software or fixing problems that may occur when installing third party software, it isn't a good idea to work your way through the different versions of the installation instructions starting with Ultra brief and working up: stick to the most detailed (it will be quicker in the end).

All versions of the installation instructions are available from the ProB homepage (`http://www.ecs.soton.ac.uk/~mal/systems/prob/`).

Available Editions:

0.5 page *Ultra quick instructions*: See the "Quick Install Instructions" at `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/INSTALL.html`. A copy of these instructions is included in the appendices of the *User Manual* in the section *Ultra Quick Instructions*.

1 pages *Brief instructions*: slightly more detail. For latest see "Full" installation instructions at `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/INSTALL.html`. A copy of these instructions is included in the appendices of the *User Manual* in the section *Brief Installation Instructions*

9 pages *Detailed instructions for* ProB *only*: detailed information only about installing ProB (not other pieces of third party software used by ProB). Includes instructions for Linux (non RPM), Solaris, Mac OSX, and Windows with screen shots where necessary. Available as PostScript, Adobe Acrobat and HTML.

15 pages *Complete OS edition*: Includes detailed installation instructions with screen shots for installing ProB as well as our guides to how to install other third party software (e.g. GraphViz, TclTk, Java) for use by ProB. Separate editions are available for Linux, Mac OSX, Solaris and Windows. Available as PostScript, Adobe Acrobat and HTML.

44 pages *Obscenely verbose edition*: Includes detailed install guide with screen shots for installing ProB as well as other software that ma y be used by ProB. Provides instructions for all editions of ProB and our instructions for additional third party software used by ProB for Solaris AND Linux (RPM and otherwise) AND Windows AND Mac OSX. Available as PostScript, Adobe Acrobat and HTML.

1.1 ProB Licence

The latest version of this information can be obtained via About→About ProB

```
Version 1.0.6
Released on June 16 2004

ProB: A B-animator and model checker
------------------------------------

(C) 2000-2004 Michael Leuschel, DSSE, University of Southampton
All rights reserved.
Free for non-commercial, academic use or evaluation purposes.
For commercial use, contact the author (http://www.ecs.soton.ac.uk/~mal).


ProB comes with ABSOLUTELY NO WARRANTY OF ANY KIND !
This software is distributed in the hope that it will be useful
but WITHOUT ANY WARRANTY. The author(s) do not accept responsibility
to anyone for the consequences of using it or for whether it serves
any particular purpose or works at all. No warranty is made about
the software or its performance.


For updates and news check:
  http://www.ecs.soton.ac.uk/~mal/systems/prob.html
  http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/Updates/

ProB uses state-of-the-art Prolog technology (co-routining, finite
domain constraint solvers, PILLOW XML package,...) to achieve symbolic debugging,
constraint-based and temporal-logic based model checking.
The tool is partly being developed within the EPSRC grants iMoc and ABCD.

Development, Copyright and Intellectual Property Rights:
B-Kernel & Model Checker:
Michael Leuschel
TCL/TK Interface:
Michael Leuschel, Laksono Adhianto
"XML to Prolog" Parser, Compiler & Further Extensions:
Michael Butler, Carla Ferreira,
Michael Leuschel, Stephane Lo-Presti, Leonid Mikhailov,
Ed Turner, Phil Turner

Open Source "B to XML" Java Parser + Type Checker:
    Bruno Tatibouet
    (see http://lifc.univ-fcomte.fr/~tatibouet/JBTOOLS/ for more details)

Known limitations:
==================

Many:
 - Unsupported features: complex definitions, some operators, WHILE loops...
    (see included machines for which features are actually supported)
 - not yet optimised for speed using partial evaluation
 - recursive set comprehension  ( ss = {xx |  ... xx: ss ...}) may not always work properly


To visualize state space,...: dot from AT&T's GraphViz package has to be installed

See the FAQ.txt file for troubleshooting and frequently asked questions.
```

1.2 Installation Requirements

This manual is concerned with the TclTk version of ProB. The prototype/alpha Java GUI version has no accompanying documentation at this time.

Please do not attempt to install ProB before ensuring you have a valid and correctly installed version of Tcl/Tk:

Windows	Version 8.3
Mac OS X	Version 8.4
Solaris	Version 8.4
Linux	Version 8.3 or 8.4 (preferred)

To get the most benefit from ProB, we *strongly* recommend that you install GraphViz and Java if they are not already installed:

Feature	*Requires*
Modification of sample machines and/or authoring of new machines	Java (Run-time or SDK)
Visualisation of State Spaces (current state, visited, shortest-path to current state)	GraphViz

Source URLs and installation instructions for TclTk, Java and GraphViz may be found in the *Verbose* edition of the installation instructions referred to below.

1.2.1 Frequently Asked Questions

- How do I get assistance with problems with ProB?
  - Non-members of Southampton University
    Please send you comments, suggestions or problems to the ProB mailing list. You can subscribe by sending an email with `subscribe prob-users` in the body to `majordomo@ecs.soton.ac.uk`.
  - Members of Southampton University
    If you are a member of Southampton University you should use the problem tracker located at https://secure.ecs.soton.ac.uk/cgi-bin/jbug/systems/ProB

    Unresolved problems remain active on the problem tracker. Please do not submit a request for help or report problems that already occur on the list. The student edition of the documentation will be updated regularly, so please also check the on-line version before submitting requests for help. If you find a problem with *ProB* (as opposed to third party software) please let us know as soon as possible. We are happy to receive suggestions for improvements to ProB or the documentation.
- Where can I get an up-to-date FAQ?

  Please check on the official ProB web page (http://www.ecs.soton.ac.uk/~mal/systems-/prob.html) . Updates will be posted there. If you subscribe to the ProB mail-list you will be notified when updates become available.
- Windows: Do I have to install ProB to C:\ProB?

  No. You can install ProB wherever you like. Note however that it is a good idea to avoid placing ProB or B machines in directories whose complete path contain spaces.
- Why is the installation manual so large / so small?

  The documentation is available in multiple editions, ranging from large and verbose to half a page. You probably have the wrong edition for your needs. Please read the first section of this document.

- The Postscript manuals won't print.

  This is likely to be due to the large colour images contained in the documentation. If you are using Windows, try to print from the Acrobat version. If we receive enough requests we will create monochrome versions of the documentation.

- Some of the figures int the html version of the manual look strange or are grey.

  This is by-produce of latex2html. We are attempting to resolve this issue.

- Why aren't there installation instructions for operating system / machine architecture XYZ.

  There are limitations on which distributions of ProB we can produce (either Sicstus Prolog isn't available for that platform or we do not have access to the relevant hardware). We won't write installation instructions for third party software if ProB cannot be compiled for that workstation or operating system.

- How can I keep my version of ProB up-to-date?

  Launch ProB and select "Check for Updates" in the *About* menu.

- The Adobe Acrobat version of the documentation looks awful on Macintosh OS X.

  This is a problem with the latex pdf generator. Convert the postscript versions of the documents using the tools that come with OS X.

1.2.2 Student Edition CDROM Frequently Asked Questions

- Java VM installation - Broken links from "Local Copies" in Installation Manual

  If you are using the Southampton University ECS distribution of ProB we have attempted to put all the software you will need onto CD. However, some URLs do not translate well to local file-systems (such as on the CDROM). Invariably, the software *will* be on the CDROM in the directory referred to by the "local copy" reference, but may contain characters in the file name that cause your browser to become confused (for example question marks and tildes).

  Currently, this problem only affects the Java installation programs from Sun. You will find the them in the cached/java.sun.com/webapps/ directory of the CDROM. Note that MAC (OS X) users should use the software update facility in preference.

- Windows Java VM Installer - Should I choose the on-line or offline installer

  Preferably use the on-line installer that is available from http://java.sun.com. (Go to the Java VM Link on the right hand side. Select "Get it Now".)

  If you intend to download the installer for later use or are using the CDROM use the offline installer. The offline version is in the directory cached/java.sun.com/webapps/download on the CDROM.

1.2.3 Installing ProB for Windows

Quick Install

Download and install (using default settings) ProB from `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/ProB_Windows_Installer.exe` .

Sources of ProB for Windows

ProB may be obtained from the Declarative Systems and Software Engineering Group of the School of Electronics and Computer Science, University of Southampton, UK (http://www.-dsse.ecs.soton.ac.uk).

The official homepage of ProB is at `http://www.ecs.soton.ac.uk/~mal/systems/prob.html` .

At the current time, the installation binary is located at

`http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/ProB_Windows_Installer.exe`

- The latest version of the installation guide can be obtained from:

  is not applicable.

- A continually updated frequently asked questions document (FAQ) is available here:

  `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/FAQ.txt`

- The user manual for ProB is available at:

  is not applicable.

Detailed guide to the installation process

The process of installing ProB for windows should be straight forward if you do not change the default installation location.

1. Download the installation binary from `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/ProB_Windows_Installer.exe`
2. Open / Run the ProB installer. The ProB Licence and general release notes will be dispayed. You must accept the Licence conditions to proceed with installatioh (Figure 1.1.)
3. Specify the directory into which ProB should be installed. Note that installing to a directory that contains spaces (e.g. Program∇Files is not recommended. Select *Install* to unpack and install ProB. (Figure 1.2.)
4. Once ProB has decompressed (Figure 1.3) to the specified directory the install window will disapper and a shortcut icon will appear on the desktop (Figure 1.4.)
5. To confirm that ProB has succesfully installed, double-click on the short-cut. Perform a self-check (Menus bar:Debug→Perform Self Check) (Figure 1.5.) A pop-up will appear stating whether the self-check has passed or not. In the unlikely event that the self-check fails, consult the section on "Trouble Shooting" in the ProB *User Manual.* (You will need to un-iconify the ProB command window and examine the output. It should look like Figure 1.6. If there is an error, the text of the error will appear in the command window as well as in a po-pup.)

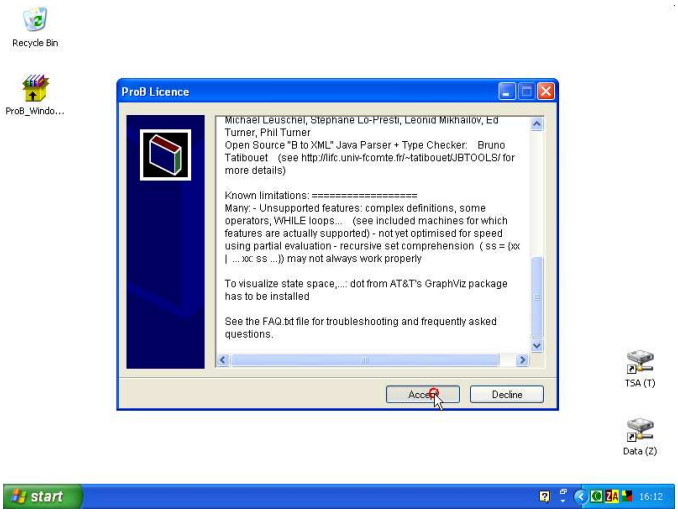
Recycle Bin
ProB_Windo...
ProB Licence
Michael Leuschel, Stephane Lo-Presti, Leonid Mikhailov, Ed Turner, Phil Turner
Open Source "B to XML" Java Parser + Type Checker: Bruno Tatibouet (see http://lifc.univ-fcomte.fr/~tatibouet/JBTOOLS/ for more details)
Known limitations: ==========
Many: - Unsupported features: complex definitions, some operators, WHILE loops... (see included machines for which features are actually supported) - not yet optimised for speed using partial evaluation - recursive set comprehension (ss = {xx | ... xx: ss ...}) may not always work properly
To visualize state space,...: dot from AT&T's GraphViz package has to be installed
See the FAQ.txt file for troubleshooting and frequently asked questions.
Accept
Decline
TSA (T)
Data (Z)
start
16:12

Figure 1.1: Open/Run the ProB decompressor/installer and accept Licence to proceed.

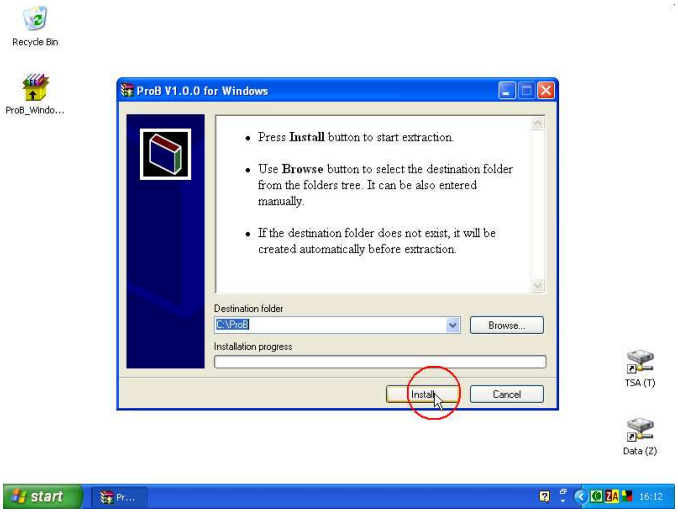

Figure 1.2: Choose installation directory (use default if possible) and select Install

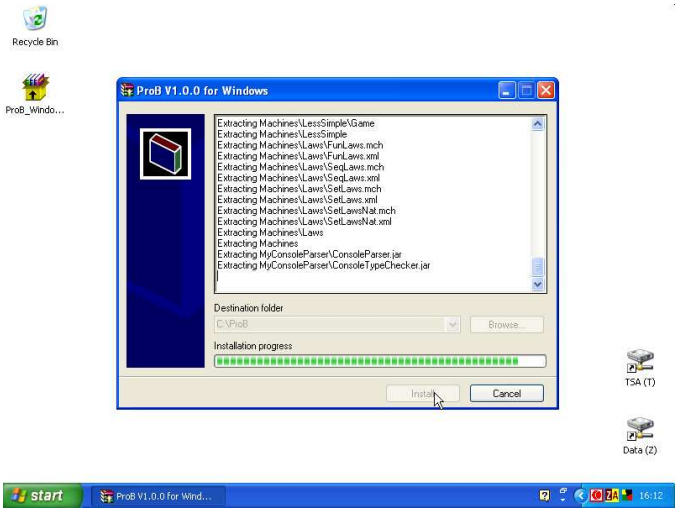

Figure 1.3: ProB will install into the selected directory (window will exit when complete).

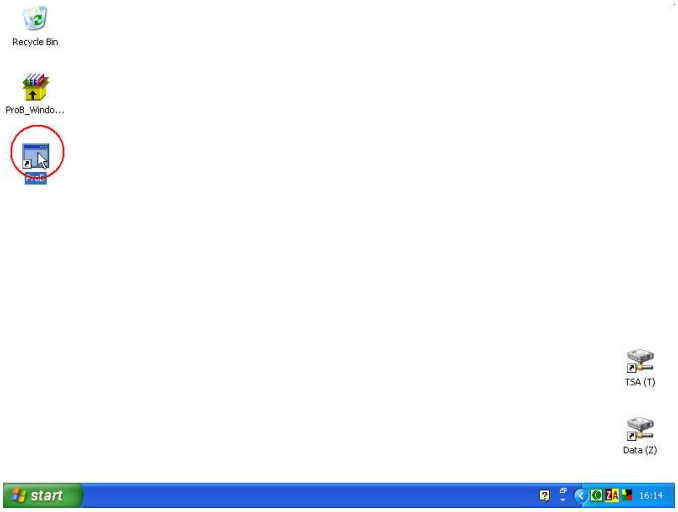

Figure 1.4: Locate and open the ProB shortcut that will have appeared on the desktop

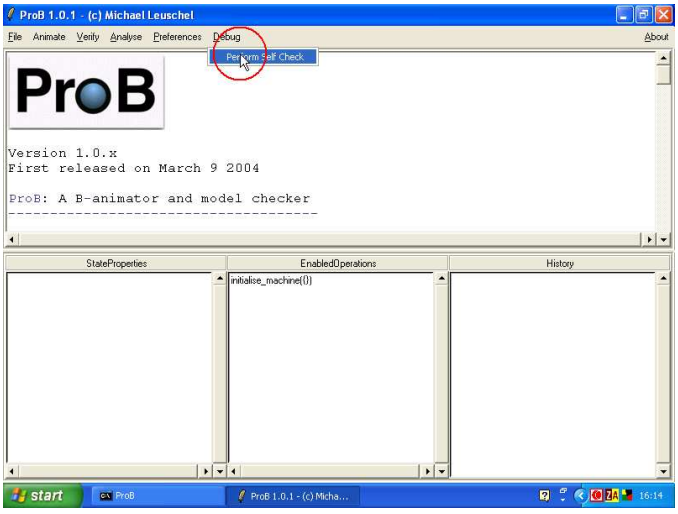

Figure 1.5: Select Perform Self Check from Debug menu of ProB

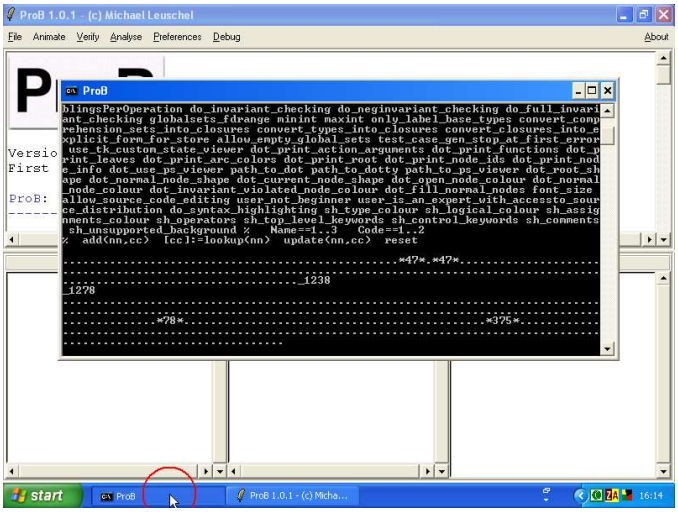

Figure 1.6: Un-iconify ProB command window to verify Self Check has passed

1.2.4 Installing ProB on Mac

Quick Install

Download that gzipped tarball from `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/ProB_Mac.tar.gz` . Decompress and unpack the tarball into the desired target installation directory (files in the tar are in ProB/). ProB can only be started when the current directory is the one created by the tar (i.e. ProB). Start ProB by running `ProBMac.sh`. On first use, run the self check command from the debug menu.

Sources of ProB for Mac

ProB may be obtained from the Declarative Systems and Software Engineering Group of the School of Electronics and Computer Science, University of Southampton, UK (http://www.-dsse.ecs.soton.ac.uk).

The official homepage of ProB is at `http://www.ecs.soton.ac.uk/~mal/systems/prob.html` .

At the current time, the installation binary is located at

`http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/ProB_Mac.tar.gz`

- Installation Guides and the User Manual can be obtained from the ProB homepage
- A continually updated frequently asked questions document (FAQ) is available here:

  `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/FAQ.txt`

Detailed guide to the installation process

1. Download the installation binary from `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/ProB_Mac.tar.gz`
2. Change to the directory into which you want to install ProB. Decompress and extract the contents of the tar. For example,

   ```
   mkdir -p ~/bin/Mac; cd ~/bin/Mac; gzip -dc ProBMac.tar.gz | tar xvf -
   ```

3. To start ProB on Mac, locate and run the extracted file `ProBMac.sh`. *Your current directory must be the same as the directory in which this file resides. Appending the extracted ProB directory to your PATH will not work.*
4. To simplify invocation of ProB, the simplest solution is to add an alias to your .login or .cshrc. For example, add the following to ∼/.login (replace the path as appropriate):

   ```
   alias ProB 'cd <directory_containing_ProBMac.sh> ; ./ProBMac.sh'
   ```

   For example,

   ```
   alias ProB 'cd ~/bin/Mac/ProB/; ./ProBMac.sh'
   ```

5. To check that ProB has been successfully installed, run the Perform Self Check option from the Debug menu. A popup will appear stating whether the self-check has passed or not. In the unlikely event that the self-check fails, consult the section on "Trouble Shooting" in the ProB *User Manual.*

1.2.5 Installing ProB on Linux

Quick Install

Download that gzipped tarball from `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/ProB_Linux.tar.gz` . Decompress and unpack the tarball into the desired target installation directory (files in the tar are in ProB/). ProB can only be started when the current directory is the one created by the tar (i.e. ProB). Start ProB by running `ProBLinux.sh`. On first use, run the self check command from the debug menu.

Sources of ProB for Linux

ProB may be obtained from the Declarative Systems and Software Engineering Group of the School of Electronics and Computer Science, University of Southampton, UK (http://www.-dsse.ecs.soton.ac.uk).

The official homepage of ProB is at `http://www.ecs.soton.ac.uk/~mal/systems/prob.html` .

At the current time, the installation binary is located at

`http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/ProB_Linux.tar.gz`

- Installation Guides and the User Manual can be obtained from the ProB homepage
- A frequently asked questions document (FAQ) is available here:

  `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/FAQ.txt`

Detailed guide to the installation process

1. Download the installation binary from `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/ProB_Linux.tar.gz`
2. Change to the directory into which you want to install ProB. Decompress and extract the contents of the tar. For example,

   ```
   mkdir -p ~/bin/Linux; cd ~/bin/Linux; gzip -dc ProBLinux.tar.gz | tar xvf -
   ```

3. To start ProB on Linux, locate and run the extracted file `ProBLinux.sh`. *Your current directory must be the same as the directory in which this file resides. Appending the extracted ProB directory to your PATH will not work.*
4. To simplify invocation of ProB, the simplest solution is to add an alias to your .login or .cshrc. For example, add the following to ∼/.login (replace the path as appropriate):

   ```
   alias ProB 'cd <directory_containing_ProBLinux.sh> ; ./ProBLinux.sh'
   ```

   For example,

   ```
   alias ProB 'cd ~/bin/Linux/ProB/; ./ProBLinux.sh'
   ```

5. To check that ProB has been successfully installed, run the Perform Self Check option from the Debug menu. A popup will appear stating whether the self-check has passed or not. In the unlikely event that the self-check fails, consult the section on "Trouble Shooting" in the ProB *User Manual.*

1.2.6 Installing ProB on Solaris

Quick Install

Download that gzipped tarball from `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/ProB_Solaris.tar.gz` . Decompress and unpack the tarball into the desired target installation directory (files in the tar are in ProB/). ProB can only be started when the current directory is the one created by the tar (i.e. ProB). Start ProB by running `ProBSolaris.sh`. On first use, run the self check command from the debug menu.

Sources of ProB for Solaris

ProB may be obtained from the Declarative Systems and Software Engineering Group of the School of Electronics and Computer Science, University of Southampton, UK (`http://www.\-dsse.\-ecs.\-soton.\-ac.\-uk`).

The official homepage of ProB is at `http://www.ecs.soton.ac.uk/~mal/systems/prob.html` .

At the current time, the installation binary is located at

`http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/ProB_Solaris.tar.gz`

- Installation Guides and the User Manual can be obtained from the ProB homepage
- A frequently asked questions document (FAQ) is available here:

  `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/FAQ.txt`

Detailed guide to the installation process

1. Download the installation binary from `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/ProB_Solaris.tar.gz`
2. Change to the directory into which you want to install ProB. Decompress and extract the contents of the tar. For example,

   ```
   mkdir -p ~/bin/Solaris; cd ~/bin/Solaris; gzip -dc ProBSolaris.tar.gz | tar xvf -
   ```

3. To start ProB on Solaris, locate and run the extracted file `ProBSolaris.sh`. *Your current directory must be the same as the directory in which this file resides. Appending the extracted ProB directory to your* `PATH` *will not work.*
4. To simplify invocation of ProB, the simplest solution is to add an alias to your .login or .cshrc. For example, add the following to ∼/.login (replace the path as appropriate):

   ```
   alias ProB 'cd <directory_containing_ProBSolaris.sh> ; ./ProBSolaris.sh '
   ```

   For example,

   ```
   alias ProB 'cd ~/bin/Solaris/ProB/; ./ProBSolaris.sh '
   ```

5. To check that ProB has been successfully installed, run the Perform Self Check option from the Debug menu. A popup will appear stating whether the self-check has passed or not. In the unlikely event that the self-check fails, consult the section on "Trouble Shooting" in the ProB *User Manual.*

1.3 Keeping ProB up-to-date

ProB is regularly updated[1]. (See the release notes in the *User Manual* to get some idea of the frequency of update releases.) If you would like to be notified of new updates please register with the ProB mailing list.

To determine if your installation of ProB is out of date, use About→Check for Updates. A pop-up will state if a more recent release of ProB is available.

A more efficient method of updating ProB came into being with version 1.0.6. Therefore if you are *using* ProB version 1.0.5 or earlier you will need to perform a fresh installation of ProB. If you are using ProB V1.0.6 or later you only need to download a replacement binary file (`ProBSolaris.sh` or `ProBLinux.sh` or `ProBMac.sh` or `ProBWin.exe` as appropriate).

Fresh Install If you do not want to risk losing change from the preference defaults, please make a backup of the file `ProB_Preferences.pl` before removing / over-writing your old installation. Simply copy this file back to directory into which the binary (`ProBSolaris.sh` or `ProBLinux.sh` or `ProBMac.sh` or `ProBWin.exe` as appropriate) resides after (re)installing. Alternatively install the new version of ProB to another directory.

Windows users can run the new installer and answer 'yes' to the prompt for over-writing files. The windows installer / un-packer should automatically attempt to re-install ProB into the directory where the existing version is installed.

UNIX (Solaris, Linux and Mac OS X) users may simply decompress and untar the installation `.tar.gz` over their existing installation.

Over-writing ProB Binary Users with version 1.0.6 or later should obtain the appropriate file (i.e. `ProBSolaris.sh, ProBLinux.sh, ProBMac, ProBWin.exe or ProB.sav` as appropriate) from `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/Updates/` and over-write their existing binary with the new copy. ProB will need to be restarted.

Solaris, Linux and Mac OS X users with `wget` installed need only change to the installation directory of ProB and run

```
wget http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/Updates/XXX
```

where `XXXX` is either `ProBSolaris.sh` or `ProBLinux.sh` or `ProBMac.sh` as appropriate. You will need to change the permissions on the downloaded file to allow execution (e.g. using `chmod u+x`).

Important Notes on Upgrading ProB

1. Updates are the latest public releases. Older versions of updates and installation binaries / tars are not currently available. Unless you retain the previous installation / update files in separate directories/locations, you will not be able to down-grade ProB to a previous version. However, if you would like a previous release of ProB please contact us.

[1] Note that you don't *need* to update ProB. Check the release file at `http://www.ecs.soton.ac.uk/~mal/systems/ProB_Download/Updates/RELEASE_HISTORY.txt` to see the recent changes.